

## Large Scale Applications of HTS in New Zealand

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**Abstract** - New Zealand has one of the longest-running and most consistently funded (relative to GDP) programmes in high temperature superconductor development and application worldwide. As a consequence, it has a sustained breadth of involvement in high temperature superconducting technologies stretching from their discovery right through to burgeoning commercial exploitation. In this talk, after alluding to the historic work of the IRL research team, I will describe the present projects of the team in its new guise as the Robinson Research Institute of Victoria University of Wellington, as well as its close interactions with spin-off companies GCS (commercial Roebel cabling) and HTS-110 (commercial HTS magnets and systems). These include the construction and grid-based testing of a three-phase 1 MVA 2G HTS distribution transformer utilizing Roebel cable and the development of a cryogen-free conduction-cooled 1.5 T YBCO-based human extremity MRI system. Ongoing activities supporting applications development such as low-temperature full-current characterization of commercial wires, our new partnership with STI, and the investigation of flux-pump technologies for efficient coil energization in rotating machines will also be discussed.

**Keywords (Index Terms)** - HTS tapes, MRI, high-field magnets, transformers, flux pumps, rotating machines, YBCO